

Name: \_\_\_\_\_

Date: \_\_\_\_\_

PC: Simplifying Rational Expressions

A **rational expression** is a ratio of polynomials. A rational expression is said to be **undefined** if its denominator is zero.

1. For what value(s) of  $x$  does the expression have no meaning?

(a)  $\frac{7}{x-3}$  (b)  $\frac{12}{x+8}$  (c)  $\frac{x-3}{x^2-16}$  (d)  $\frac{x-2}{x^2+4}$

2. Find the value(s) of the variable for which each rational expression is not defined.

(a)  $\frac{x^2-49}{2x^2-4x}$  (b)  $\frac{5}{c^2-25}$  (c)  $\frac{x-3}{x^2+9}$  (d)  $\frac{6}{3x^2-8x+4}$

Simplify each expression.

3.  $\frac{x^2+6x}{x}$

8.  $\frac{x^2-x-6}{3x^2-15x+18}$

4.  $\frac{x^2}{x^2+3x}$

9.  $\frac{y^2-3y-18}{2y^2+5y+3}$

5.  $\frac{5b^2-5ab}{2a^2-2ab}$

10.  $\frac{x^2-y^2}{x^2-6y-xy+6x}$

6.  $\frac{x^2+2x-3}{x^2-1}$

11.  $\frac{1-x^2}{x^3-1}$

7.  $\frac{5x^2-15x}{27x-3x^2}$

12.  $\frac{x^2+2x+xy+2y}{x^2+4x+4}$

13.  $\frac{x^3 + 27}{x^3 - 3x^2 + 9x}$

**Steps for Simplifying Rational Expressions:**

1. Completely factor the numerator and denominator
2. Cancel common factors

**\*Note**  $\frac{a-b}{b-a} = -1$

**\*\*Don't forget to write restrictions.\*\***